

IN THE CLAIMS

This listing of the claim will replace all prior versions and listings of claim in the present application.

Listing of Claims

Claims 1-20 (canceled).

21. (currently amended) A storage system comprising:

a plurality of host adaptors coupled to at least one host device, which form interfaces for the host device;

a plurality storage devices for storing therein data transferred from the host device;

a plurality of disk adaptors coupled to said storage devices, which form interfaces for said storage devices;

a cache for temporarily storing therein data transferred between said plurality of host adaptors and said ~~plurality of disk adaptors~~;

two buses, coupled to said ~~plurality of host adaptors~~, said ~~plurality of disk adaptors~~, and said cache, which transfer data among said ~~plurality of host adaptors~~, said ~~plurality of disk adaptors~~, and said cache,

wherein said two buses operate as a pair of buses having a transfer ability larger than one of said two buses;

a memory for storing information indicating status of which of said two buses is available for use due to a failure in the other of said two buses, ~~and~~

wherein each of said ~~plurality of~~ host adaptors includes a format converter for converting data of a count key data (CKD) format ~~of data sent from said the~~ host

device into data of a fixed block architecture (FBA) format suitable for storage in said
storage devices and sending the converted data of the ~~second~~ FBA format to said
cache through said two buses, ~~and~~

wherein said cache stores the converted data of the FBA format converted by
said format converter, and

wherein upon failure one of said two buses is used based on said status
information stored in said memory.

Claim 22 (canceled).

23. (previously presented) A storage system according to claim 21,
wherein said memory can be referred to by an external processor.

24. (currently amended) A storage system comprising:
a plurality of host adaptors coupled to at least one host device, which form
interfaces for the host device;
a plurality of storage devices for storing therein data transferred from the host
device;
a plurality of disk adaptors coupled to said storage devices, which form
interfaces for said storage devices;
a plurality of caches for temporarily storing therein data transferred between
said ~~plurality of~~ host adaptors and said ~~plurality of~~ disk adaptors;

two buses, coupled to said ~~plurality of~~ host adaptors, said ~~plurality of~~ disk adaptors, and said ~~plurality of~~ caches, which transfer data among said ~~plurality of~~ host adaptors, said ~~plurality of~~ disk adaptors, and said ~~plurality of~~ caches, wherein said two buses operate as a pair of buses having a transfer ability larger than one of said two buses;

a memory for storing ~~a status~~ information indicating ~~of which of said two buses is available for use due to a failure in the other of said two buses,~~ and

wherein each of said ~~plurality of~~ host adaptors includes a format converter for converting data of a count key data (CKD) format ~~of data sent from said a host device into data of~~ a fixed block architecture (FBA) format suitable for storage in said storage devices and sending the converted data of the ~~second~~ FBA format to said ~~cache caches~~ through said two buses, and

wherein said cache stores ~~caches store~~ the converted data of the FBA format converted by said format converter and

wherein upon failure one of said two buses is used based on said status information stored in said memory.

Claim 25 (canceled).

26. (previously presented) A storage system according to claim 24, wherein said memory can be referred to by an external processor.

27. (currently amended) A storage system comprising:

a plurality of ~~first logical units~~ host adaptors, coupled to at least one host device, which form interfaces for the host device;

a plurality of storage devices for storing therein data transferred from the host device;

a plurality of disk adaptors, ~~second logical units~~ coupled to said storage devices, which form interfaces for said storage devices;

at least one cache memory unit for temporarily storing therein data transferred between said host adaptors ~~plurality of first logical units~~ and said disk adaptors ~~plurality of second logical units~~;

at least one passpath, coupled to said host adaptors ~~first logical units~~, said disk adaptors ~~plurality of second logical units~~ and said at least one cache memory unit, which transfers data among said host adaptors ~~first logical units~~, said ~~plurality of second logical units~~ disk adaptors and said at least one cache memory unit, and

wherein each said host adaptors ~~plurality of storage devices~~ includes a format converter for converting data of a count key data (CKD) format ~~of data~~ sent from said host device into data of a fixed block architecture (FBA) format suitable for said storage devices, and sending the converted data of the FBA format to said at least one cache memory unit through said at least one passpath, and said at least one cache memory unit stores the converted data of the FBA format converted by said format converter.

Claim 28 (canceled).

29. (currently amended) A storage system according to claim 27, further comprising:

a shared memory unit which stores therein control information for controlling said ~~first logical units~~ host adaptors, said ~~plurality of second logical units~~ disk adaptors and said at least one cache memory unit.

30. (previously presented) A storage system according to claim 29, wherein said at least one cache memory unit has a plurality of cache memories arranged in a duplexed form, and said shared memory unit has a plurality of shared memories arranged in a duplexed form.

31. (currently amended) A storage system according to claim 27, wherein said at least one ~~pass-path~~ is a duplexed common bus.

32. (currently amended) A storage system according to claim 31, wherein said duplexed common bus includes:

a control information bus, coupled to said ~~first logical units~~ host adaptors and said disk adaptors ~~second logical units~~, which transfers control information, and

a data transfer bus, coupled to said ~~first logical units~~ host adaptors, said ~~second logical units~~ disk adaptors and said at least one cache memory unit, which transfers data among said host adaptors ~~first logical units~~, said disk adaptors ~~second logical units~~ and said at least one cache memory unit.

Claim 33 (canceled)

34. (previously presented) A storage system according to claim 27, wherein said format converter converts data of the CKD format into data of the FBA format and adds a longitudinal redundancy check (LRC) code to the data of the FBA format thus converted, and said format converter fetches a part of physical address information data sent from said host device and generates a logical address of a logical storage device which is formed by said storage devices.

35. (currently amended) A storage system according to claim 27; wherein said ~~first logical units receives~~ host adaptors receive physical address information, data of the CKD format and a cyclic redundancy check (CRC) code on a storage space of said storage devices, and

wherein said format converter converts data of the CKD format into data of the FBA format, fetches the physical address as a part of the data and generates a logical address on said storage devices, and then writes the data thus converted into said cache memory unit through said passpath.

36. (currently amended) A storage system according to claim 27, wherein said format converter, at a time of writing said data thus converted into said at least one cache memory unit, adds an error correction code (ECC) to said data and then writes said data thus added with the ECC into said at least one cache memory unit, and

wherein when said disk adaptors ~~second logical unit receives~~receive the data thus converted from said at least one cache memory unit through said at least one path, said disk adaptors ~~second logical unit adds~~add a CRC code to said data received and ~~writes~~write said data thus added with the CRC code into said storage ~~device~~devices.

37. (currently amended)A storage system comprising:

a plurality of ~~first logical units~~host adaptors, coupled to at least one host device, which form interfaces for the host device;

a plurality of storage devices for storing therein data transferred from the host device;

a plurality of ~~second logical units~~disk adaptors, coupled to said storage devices, which form interfaces for said storage devices;

at least one cache memory unit for temporarily storing therein data transferred between said ~~plurality of first logical units~~host adaptors and said ~~plurality of second logical units~~disk adaptors; and

at least one ~~pass~~path, coupled to said host adaptors~~first logical units~~, said ~~plurality of second logical units~~disk adaptors and said at least one cache memory unit, which transfers data among said ~~first logical units~~host adaptors, said ~~plurality of second logical units~~disk adaptors and said at least one cache memory unit,

wherein each of said ~~plurality of first logical units~~host adaptors includes a format converter for converting data of a count key data (CKD) format ~~of data sent from said the~~ host device into data of a fixed block architecture (FBA) format suitable

for said storage devices, and sending the converted data of the (FBA) format ~~suitable for said storage devices~~, to said at least one passpath; and

wherein said at least one cache memory unit then stores therein the converted data of the FBA format converted by said format converter and sent through said at least one passpath.

38. (currently amended)A storage system according to claim 37, wherein said at least one pass-path is a duplexed common bus.

39. (currently amended)A storage system according to claim 38, wherein said duplexed common bus includes:

a control information bus, coupled to said ~~first logical units~~host adaptors and said ~~second logical units~~disk adaptors, which transfers control information; and

a data transfer bus, coupled to said ~~first logical units~~host adaptors, said ~~second logical units~~disk adaptors and said at least one cache memory unit, which transfers data among said ~~first logical units~~host adaptors, said ~~second logical units~~disk adaptors and said at least one cache memory unit.

Claim 40 (canceled).

41. (currently amended)A storage system according to claim ~~40~~37, wherein said format converter converts data of the CKD format into data of the FBA format and adds a Longitudinal Redundancy Check an-(LRC) code to the data of the

FBA format thus converted, and said format converter fetches a part of physical address information data sent from ~~said~~the host device and generates a logical address of a logical storage device which is formed by said storage devices.

42. (currently amended) A storage system according to claim 37, wherein said ~~first logical units~~host adaptors receive physical address information, data of the CKD format and a Cyclic Redundancy Check (CRC) code on a storage space of said storage devices, and

wherein said format converter converts data of the CKD format into data of the FBA format, fetches the physical address as a part of the data and generates a logical address on said storage devices, and then writes the data thus converted into said at least one cache memory unit through said at least one ~~pass~~path.

43. (new) A storage system comprising:

at least one adaptor, coupled to at least one host device and to a plurality of storage devices, which forms an interface for said at least one host device and said storage devices,

wherein said storage devices store therein data transferred from said at least one host device;

at least one cache memory unit for temporarily storing therein data transferred from said at least one adaptor; and

at least one path, coupled to said at least one adaptor and said at least one cache memory unit, which transfers data between said at least one adaptor and said at least one cache memory unit,

wherein said at least one adaptor includes a format converter for converting data of a count key data (CKD) format of data sent from said at least one host device into data of a fixed block architecture (FBA) format suitable for said storage devices, and sending the converted data of the FBA format to said at least one cache memory unit through said at least one path, and said at least one cache memory unit stores the converted data of the FBA format converted by said format converter.

44. (new) A storage system according to claim 43, further comprising:
a shared memory unit which stores therein control information for controlling said at least one adaptor and said at least one cache memory unit.

45. (new) A storage system according to claim 44, wherein said at least one cache memory unit has a plurality of cache memories arranged in a duplexed form, and said shared memory unit has a plurality of shared memories arranged in a duplexed form.

46. (new) A storage system according to claim 43, wherein said at least one path is a duplexed common bus.

47. (new) A storage system according to claim 46, wherein said duplexed common bus includes:

a control information bus, coupled to said at least one adaptor, which transfers control information, and

a data transfer bus, coupled to said at least one adaptor and said at least one cache memory unit, which transfers data among said at least one adaptor and said at least one cache memory unit.

48. (new) A storage system according to claim 43, wherein said format converter converts data of the CKD format into data of the FBA format and adds a longitudinal redundancy check (LRC) code to the data of the FBA format thus converted, and said format converter fetches a part of physical address information data sent from said host device and generates a logical address of a logical storage device which is formed by said storage devices.

49. (new) A storage system according to claim 43, wherein said at least one adaptor receives physical address information, data of the CKD format and a cyclic redundancy check (CRC) code on a storage space of said storage devices, and

wherein said format converter converts data of the CKD format into data of the FBA format, fetches the physical address as a part of the data and generates a logical address on said storage devices, and then writes the data thus converted into said at least one cache memory unit through said at least one path.

50. (new) A storage system according to claim 43, wherein said format converter, at a time of writing the data thus converted into said at least one cache memory unit, adds an error correction code (ECC) to said data and then writes said data thus added with the ECC into said at least one cache memory unit, and

wherein when said at least one adaptor receives the data thus converted from said at least one cache memory unit through said at least one path, said at least one adaptor adds a CRC code to said data received and writes said data thus added with the CRC code into said storage device.

51. (new) A storage system comprising:

at least one adaptor, coupled to at least one host device and to a plurality of storage devices, which forms an interface for said at least one host device and said storage devices,

wherein said storage devices store therein data transferred from said at least one host device;

at least one cache memory unit for temporarily storing therein data transferred from said at least one adaptor; and

at least one path, coupled to said at least one adaptor and said at least one cache memory unit, which transfers data between said at least one adaptor and said at least one cache memory unit,

wherein said at least one adaptor includes a format converter for converting data of a count key data (CKD) format sent from said at least one host device into

data of a fixed block architecture (FBA) format suitable for said storage devices, and sending the converted data of the FBA format to said at least one path, and wherein said at least one cache memory unit then stores therein the converted data of the FBA format converted by said format converter and sent through said at least one path.

52. (new) A storage system according to claim 51, wherein said at least one path is a duplexed common bus.

53. (new) A storage system according to claim 52, wherein said duplexed common bus includes:

a control information bus, coupled to said at least one adaptor, which transfers control information; and

a data transfer bus, coupled to said at least one adaptor and said at least one cache memory unit, which transfers data among said at least one adaptor and said at least one cache memory unit.

54. (new) A storage system according to claim 51, wherein said format converter converts data of the CKD format into data of the FBA format and adds a longitudinal Redundancy Check (LRC) code to the data of the FBA format thus converted, and said format converter fetches a part of physical address information data sent from said host device and generates a logical address of a logical storage device which is formed by said storage devices.

55. (new) A storage system according to claim 51, wherein said at least one adaptor receives physical address information, data of the CKD format and a Cyclic Redundancy Check (CRC) code on a storage space of said storage devices, and

wherein said format converter converts data of the CKD format into data of the FBA format, fetches the physical address as a part of the data and generates a logical address on said storage devices, and then writes the data thus converted into said cache memory unit through said at least one path.